TURN TAKING: SYNCHRONY AND SEX ROLE IN CONVERSATIONAL INTERACTION

By

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DEDICATION

To Norm Markel and the Gainesville Society for the Study of Coverbal Behavior, in solidarity.

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TURN TAKING: SYNCHRONY AND SEX ROLE IN CONVERSATIONAL INTERACTION

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The study of nonverbal behavior has focused in recent years on the conversation. The conversation turn has come into favor, since it provides an immediately recognizable unit of analysis for nonverbal behavior as it occurs in conversation. The purpose of the present study was to elucidate the structure of nonverbal behavior within conversation turns and the manner in which participants in two-person conversations synchronize their nonverbal behavior. Two models of interaction were compared. Both models postulate that interactants follow behavioral norms which govern their communicative behavior and reflect their relationship, and both models predict that adherence to such norms leads to smooth-flowing interactions, including smooth exchanges of the floor. The models differ in that one predicts that these norms are evidenced by the behavior within one turn, while the other predicts that these norms are evidenced at the level of the interact, or pair of turns. Adherence to the norm of behavioral synchrony was chosen as a point of departure. In addition, a hypothesis that synchrony is greater in mixed-sex dyads than in same-sex dyads emerged from a consideration of sex-role expectations. Finally, it was hypothesized that interactants synchronize their own behavior across two turns.

Twelve males and twelve females each participated in one conversation with a partner of the same sex and one with a partner of the opposite sex. The conversations were videotaped, and the beginnings and endings of each occurrence of several nonverbal behaviors were tracked. The occurrence or non-occurrence of each nonverbal behavior in each turn was marked, and several measures of the association of behaviors within and across turns were developed.

Results indicated that subjects synchronized their nonverbal behavior within one turn, but not across turns. Specifically, in mixed-sex dyads facing (gaze direction) by one interactant in one turn was more likely to be accompanied by facing by the other interactant within the same turn than by any other behavior; the same was true for hand movement and head nods. In same-sex dyads, facing was most likely to be accompanied by facing. No behaviors were found to be in synchrony across two turns. In addition, no relation between synchrony and exchange of the floor was found. The consequences for the models were discussed, and it was concluded that the turn-based model is superior to the interact-based model for the structural analysis of nonverbal behavior in conversation. Neither model was found to be adequate for the prediction of exchanges of the floor, and several possible reasons for this failure were discussed.

No significant differences in the extent of synchrony between mixed-sex and same-sex dyads were found, although the results were all in the predicted direction. Several mitigating influences on sex-role expectations which may have contributed to these results and their consequences for future research in the area of sex roles were discussed.

Individual interactants in mixed-sex dyads were found to follow their own facing, head movements, and head tilts in one turn with the same behavior in the next turn.

The results of the study point to two structurally different classes of turns which may have different functions in conversation. One type of turn contains pausing by the speaker and hand movements, head tilt, and head nods by the listener. These turns may be the ones in which most of the information in a conversation is exchanged. The second class of turns can be distinguished by facing by both speaker and listener, and may function to maintain the interaction during periods of transition.

CHAPTER I

INTRODUCTION

Social scientists in every discipline have long been interested in the ways in which human beings use their voices and bodies to express their own personalities and emotions, as well as to express and manipulate their relationships with others. Only relatively recently, however, as Kendon (1975) has pointed out, have investigations of the behaviors themselves begun to excite research interest. As increasing numbers of researchers have entered the field, they have become aware of the critical lack of a unified language to describe the phenomena of interaction and of a viable methodology to study it. Out of this concern has come the suggestion that behavior be studied as it occurs naturally in normal interactions between people; Goffman (1971) has called this study "interaction ethology." Thus, the conversation has become an increasingly popular setting for research, and the present study followed this trend.

One aspect of behavior in human (or any other) interaction which makes it resistant to systematic examination is its continuous, flowing character. An immediate research problem, therefore, is the specification of a reasonable unit into which behavior can be segmented. This problem has prompted suggestions ranging from the smallest discriminable bit of behavior, the "kine" (Birdwhistell, 1952) to a unit as large as several hours or more, the "episode" (Barker, 1963). One unit of moderate

size which has lately received considerable attention is the conversation turn, which can be defined as the period of time in which one speaker holds the floor. The present investigation was an extension of research on the turn and of the rules which govern turn-taking behavior.

Two views of the relationship between participants in conversation have received much attention in research on face-to-face interaction. Some investigators have looked at interactnats as acting in linear sequences, in which each piece of behavior by one person is the stimulus for a response by another. Other researchers, however, have concentrated on the overlapping character of behavior in conversation, and have looked at interactants as mutually and simultaneously influencing one another. Scheflen (1975) has argued that the first view cannot possibly do justice to the phenomena of interaction, and work showing fine-grained synchronization of behavior between participants in conversation (Condon & Ogston, 1966, 1967; Kendon, 1970, 1972) would seem to bear him out. These two views are the basis for two models of interaction, one proposed by Hawes (1973) and the other formalized by Saine (Note 1), which were compared in the present investigation. That is, the ability of each model to predict synchronization of nonverbal behavior by participants in two-person conversations was tested. In comparing the models, the present study also attempted to examine the adequacy of the turn as a unit of analysis.

The notion on which both these models are based, that behavior in face-to-face interaction is governed by rules and norms which influence and reflect the relationships between interacting individuals, leads naturally to a consideration of the effect of different role structures

on conversation. Sex roles are an obvious and important arena for this study. The present study investigated the effect of two different sex combinations, mixed-sex and same-sex dyads, on the synchronization of nonverbal behavior.

The purpose of the present study, then, was three-fold. First, it was an exploration of the way in which nonverbal behavior is structured within conversation turns. Second, it examined the adequacy of the turn as a unit of analysis for conversational interaction. Finally, the study looked at the influence of a social variable, the sexual composition of the dyad, on the norms which apply to behavioral synchrony in conversation.

Methodological Issues

As Harrison and Knapp have pointed out:

> The term "nonverbal communication" has been applied to a broad range of phenomena: everything from facial expression and gesture to fashion and status symbol, from dance and drama to music and mime, from the flow of affect to the flow of traffic, from the territoriality of animals to the protocol of diplomats, from extra-sensory perception to analog computers, and from the rhetoric of violence to the rhetoric of topless dancers.(1972, p. 343)

The contents of the two major bibliographies in the field (M. Davis, 1972; Hayes, 1957), ranging from ritual body postures through research on the kinemes of stress, bear witness to the enormous scope of the area variously called "nonverbal behavior," "nonverbal communication," and "body language." No really successful definition of the terms has been forthcoming, although several have been attempted (e.g., Ekman & Friesen, 1969b; MacKay, 1972; Wiener, Devoe, Rubinow, & Teller, 1972), partly because researchers in the field have been pursuing their goals from a number of different methodological perspectives. Three methodological

issues--the appropriate setting (or settings) for research on nonverbal behavior, the appropriate behaviors for study, and the level and unit of analysis--have repeatedly come to the fore in recent years. The first part of this paper is devoted to a discussion of these issues and the way they were dealt with in the present study.

Appropriate Setting for Study

Some of the most revealing acts of nonverbal behavior may occur when a person is alone (Ekman & Friesen, 1972), but social scientists have nonetheless typically studied an interpersonal setting--one in which the actor is either interacting with others or being evaluated by them. Much of the cross-cultural work has examined cultural influences on such rituals as folk singing and dancing (e.g., Lomax, 1968, 1975), but social psychologists, at any rate, have tended to neglect these areas of highly stereotyped behavior in favor of the study of nonverbal behaviors either in the abstract or in interactions involving speech.

Early work in this area was largely concentrated in an effort to determine the relationships between various facial expressions and judgments of emotion. Photographs or models of the human face with interchangeable parts were used to elicit judgments of emotion from naive observers (see Davitz, 1964, for a review of this literature). Although reliable results were obtained, this research has been criticized for the artificiality of the stimuli used and for ignoring the movement dimension so important to expressive behavior. Bruner and Tagiuri's (1954) trenchant survey of the area effectively marks the end of this period of research; however, more recent studies using more sophisticated techniques (Drag & Shaw, 1967; Ekman & Friesen, 1971; Woodall, 1976) may have reopened the area.

Turning from this analysis of nonverbal behavior in the abstract, investigators began to study the face and body movements of interviewees, and particularly of patients in psychiatric interviews. Again, the emphasis was on observer analysis of patient behavior. A seminal work in this area was the microscopic analysis of a patient's verbal behavior during the first five minutes of an initial psychiatric interview (Pittenger, Hockett, & Danehy, 1960). More recently, Scheflen (1965) made an extensive study of what he called "courtship" and quasi-courtship behaviors in psychotherapy sessions. Dittmann (1962) related body movements to the affective state of patients. Mahl (1968) described, from a psychoanalytic perspective, body movements which he concluded were precursors of the resurfacing of repressed experiences. Lastly, Ekman and Friesen (1969a) isolated particular gestures which were related to deception, both in psychiatric interviews and in volunteer subjects.

This body of research has provided a great deal of useful information about possible relationships between patients' expressive behavior and other factors, but it still has serious drawbacks. For one thing, the psychiatric (or any) interview is a very special kind of interaction, and the generality of the results of these studies to any other settings is open to question. For example, Wiener et al. (1972) have pointed out that the interviewer may elicit the very behavior he or she wishes to study by asking leading questions about the patient's emotional state. Second, too many of these investigations (e.g., Mahl, 1968; Scheflen, 1965) involve anecdotal or case studies and may have included highly idiosyncratic behaviors. Finally, and perhaps most seriously, as Wiener, et al. have argued, this research, because of its emphasis on

the "meaning" or "communicative import" of particular behaviors, is particularly vulnerable to a confusion between the message sent by the patient and the observations made by the interviewer, and this confusion is part of the cause of uncertainty about just what nonverbal communication is.

In part because of these problems, recent research has become more involved with naturally occurring interactions between people. Some researchers, like Birdwhistell (1952), have long advocated this naturalistic approach. The most obvious setting is the face-to-face conversation, and especially the two-person conversation, which, as Cherry (1961) noted, is such a common form of human interaction. There is no real consensus about what a conversation is, but Markel (1975) has suggested that the dictionary definition, which describes conversation as "the informal interchange of thoughts and ideas by spoken words," is a workable definition for social-psychological research.

Conversation as a setting for the study of nonverbal behavior has several advantages in addition to its naturalness and ubiquity. As Kendon (1975) has stated, we are all conversational speakers, and we have an intuitive recognition of the orderliness of this type of interaction, something that is not true in all settings. In addition, participants in conversation are members of what sociolinguists call the same speech community (Ervin-Tripp, 1969) and thus share a common verbal code, so that nonverbal behaviors occurring regularly are probably the result of shared social norms rather than individual habits. Both participants in a two-person conversation can be studied, <u>as a dyad</u>, and this examination allows analysis of what Kendon (1975)

has called the "emergent" side of human interaction--that which is not a direct result only of the personalities, social statuses, and immediate environment of the interactants. Indeed, one such emergent effect--that of dyadic synchrony--was a major focus of the present study. Finally, the study of conversation limits the scope of nonverbal behaviors to be analyzed to those which Markel (1975) has termed "coverbal"; that is, "the behavior of interlocutors which occurs in association with or accompanying words, but which is not essential for the articulation or grammatical functioning of those words"(p. 189).

For these reasons, then, the setting of the present study was the two-person conversation, and the behaviors under study were coverbal behaviors.

Appropriate Behaviors for Study

Even when only coverbal behaviors are considered within the context of conversational interaction, the list of possible behaviors for examination is very long and includes every part of the body from the roots of the hair to the tips of the toes. The choice of behaviors for study, or rather, the choice of which behaviors to leave out, therefore, is not obvious. Some possible criteria for selection, however, have been offered by Markel (1975): (1) the behaviors should be important in conversation, (2) they should be easily observable by interactants, and (3) they should be readily recordable from videotapes of the interaction, since this is the usual medium of data analysis (essentially the same restrictions apply to films of entire interactions as apply to videotapes). Whether a behavior meets the first criterion can only be decided on the basis of research and this, indeed, was another

purpose of the present study. On the basis of the second and third criteria, however, some types of coverbal behavior can be eliminated more or less a priori. For example, movements of the legs and feet are probably not readily observable by interactants, since participants in conversation are expected to spend much of their time looking at the face of their partners, and the rest of it looking altogether away (see Ellsworth & Carlsmith, 1968). On the basis of these considerations and previous research, several coverbal behaviors were selected for the present study. They are listed below, along with a very brief review of the literature pertaining to them: operational definitions of the behaviors are presented in the next chapter, in Table 1.

Pausing. Amount of silence or pausing, has been found, among other things, to be inversely correlated with anxiety (Mahl, 1956, 1961; Pope, Siegman, & Blass, 1970) and directly correlated with grammatical encoding (Boomer, 1965; Boomer & Dittmann, 1962) and cognitive activity (Goldman-Eisler, 1968); a review of this literature can be found in Bein (1974) and Jaffe and Feldstein (1970). Jaffe and Feldstein (1970) found that frequency and duration of pauses were stable across settings in unconstrained conversations; however, Gallois and Markel (1975) found that they varied systematically with language spoken, and they concluded that pausing may be susceptible to changes in role.

Facing. This behavior (also called looking and gaze direction) along with its dyadic correlate eye contact, may be the most studied of all coverbal behaviors; a review of much of the literature can be found in Ellsworth and Ludwig (1972). To give a few examples, facing has been found to increase with attraction (Argyle & Dean, 1965; Exline,

Gray, & Schuette, 1965; Exline, 1971), to be engaged in more by women (Argyle, Salter, Nicholson, Williams, & Burgess, 1970; Exline, Gray, & Schuette, 1965; Kendon, 1967), to be employed at different times by blacks and whites (LaFrance & Mayo, 1976), and to be a signal of dominance (Exline, 1971). It has also been found to be associated with the role of listener and to precede exchange of the floor (Duncan, 1972; Kendon, 1967; LaFrance & Mayo, 1976).

Hand movement. One of the earliest investigations of nonverbal behavior (Efron, 1941) related cultural differences to variations in hand movement. Since that time, amount of hand movement has been related to approval seeking (Dittmann, 1962) and affiliation (Mehrabian, 1971), and particular types of gestures have been associated with speech (Freedman & Hoffman, 1967), deception (Ekman & Friesen, 1969a), and attraction (Mehrabian, 1970, 1971).

Several investigators have developed systems for categorizing hand movements. Two of the most comprehensive are by Ekman and Friesen (1972) and Wiener, et al. (1972). These systems are both based on deciding what role the hand movement plays in relation to speech. Both systems are vulnerable to two problems. First, it is not obvious when a particular gesture begins or ends. Physical criteria such as cessation of movement or change in direction of movement cannot be used, since many gestures which substitute for words, for example, involve stops and several changes in direction. Second, there are many borderline gestures which cannot be conveniently fitted into any category or which, on the other hand, fit several categories at once. The present study, therefore, examined the simple occurrence of any hand movement. This behavior,

as will be noted in a later section of this paper, has been found to play an important part in conversational synchrony (Condon & Ogston, 1966, 1967; Kendon, 1970, 1972).

Body touching. This behavior has been studied only infrequently. It has been found to be positively related to anxiety (Freedman & Hoffman, 1967), however, and Scheflen (1965) has related it to de-courting and self-protection.

Head tilt. Oddly enough, in spite of the frequency with which head tilt occurs in conversation, it has been very little studied indeed. It does, however, appear in the notation systems of both Birdwhistell (1952) and Frey (1975), and Frey has also found that lateral head tilts occur in contexts where up, down, left, or right movements, which might restrict vision, do not. Mehrabian (1971) and Mehrabian and Ksionzky (1970) have also related general body assymetry, which includes head tilt, to relaxation. Anecdotally, head tilts appear to be an orienting response in both humans and animals, and may be a way of indicating to the partner that one is paying attention.

Head nod. Dittmann and Llewellyn (1968) and Kendon (1970) have identified head nods as listener responses, and Condon and Ogston (1966) have identified them as being synchronized with speech. In addition, head nods by the speaker have been found to be an approval-seeking or affiliative cue (Knapp, 1972; Mehrabian, 1971; Rosenfeld, 1966). Finally, Argyle (1972) has pointed out that head nods may act as rein-forcers by one interactant of another's behavior.

Head shake. This behavior is probably fairly specific to contexts of denial (although it may sometimes be used to indicate absolute

certainty about a statement, that is, to indicate that there can be no doubt); and perhaps for this reason has been relatively little studied (like head tilt, it does appear in Birdwhistell's, 1952, and Frey's 1975, notation systems).

Body shift. Changes in gross body position have been found to be markers of changes in the topic of conversation or in the immediate conversational situation (Erickson, 1975; Scheflen, 1973). As such, they may be markers of large segments of conversational interaction, like the "episodes" described by Barker (1963).

The literature on the various coverbal behaviors picked for inclusion in the present study indicates that most of them are related to attraction or affiliation. Several of them also appear to play a role in the smooth exchange of the floor in conversation. Both of these variables are relevant to the notion of synchrony and will be discussed again in a later section.

Sex differences in facing have also been reported. There is reason to believe that variations in facing behavior are related to different sex roles. This issue will also be considered in a later section.

Level and Unit of Analysis

Even when one has decided to study human interaction in the setting of the naturally-occurring conversation and has picked a particular set of coverbal behaviors for analysis, the question of the level of analysis and the unit (or units) into which the interaction will be segmented still remains. Duncan (1969) has described two approaches to this problem, the structural and external variable approaches. These points of view, along with the turn-based approach taken in the present study, are briefly reviewed in this section.

Structural approach. Along with using naturalistic observations as data, as advocated by Birdwhistell (1952, 1970) and Barker (1963), workers in the structural tradition typically engage in a minute examination of the behavior they have observed and filmed. Small quantities of film (sometimes less than five seconds) are analyzed frame-by-frame, and the movement and position of every part of the body is coded. Birdwhistell (1952, 1970) has argued that this tedious analysis is justified because nonverbal behavior is a language-like system susceptible to structural analysis similar to that used by linguists on verbal behavior. According to Birdwhistell, nonverbal behavior is a system of related behaviors with three basic functions: (1) to accompany and add to linguistic structure, (2) to cue other interactants in the flow of conversation, and (3) to communicate meaning of its own. The smallest discriminable units of nonverbal behavior are called kines, which are grouped together into meaning-bearing classes called kinemes; these combine systematically into meaning-bearing packages called kinemorphs, which in turn combine according to morpho-syntactic rules to form behavioral acts (like words) and actions (like sentences and paragraphs). The meaning of a particular behavior, thus, can only be understood within the context of the act or action of which it is a part. The task of the researcher in "kinesics" (Birdwhistell, 1952) is first to classify behavior into these units and then to elucidate the rules for combining them. This task is accomplished by showing selected bits of behavior to native informants in order to classify the behaviors into kinemes and kinemorphs on the basis of meaning distinction and difference. Using this methodology, Birdwhistell (1970) has described a large number of face and head kinemes and some kinemorphs, and has also isolated several American behavior displays.

Some researchers in this tradition, while accepting the notion that bits of behavior have specific meaning in context, feel that nonverbal behavior takes place too much out of awareness to be structured analogously to language. Rather, they have grouped the behaviors into clinically-determined functional classes (Scheflen, 1965), or classes based on the ways in which the behaviors accompany and punctuate spoken language (Dittmann, 1962; Dittmann & Llewellyn, 1968, 1969), or the manner in which partners in conversational interaction synchronize their behavior (Condon & Ogston, 1966, 1967; Kendon, 1970, 1972). All of these variants fit into Birdwhistell's general framework, but none of them really adopts his approach to nonverbal behavior as a system with all the structural richness of language. Rather, these researchers have attempted to elucidate the social norms which govern nonverbal behavior.

External variable approach. On the other side of the coin, social psychological research has taken a more strictly functional approach to the study of nonverbal behavior. Ekman (1971) and Ekman and Friesen (1971, 1972), for example, have stated that nonverbal behavior has two basic functions: (1) the universal and probably innate display of emotions, and (2) the more subtle communication of emotion using learned displays. Although Ekman and Friesen's analysis is fine-grained, using the slow-motion monitoring of films and videotapes, their main interest is in the frequency and duration of the various classes of behavior they have isolated and their relation to emotional state. As a result, they have tended to manipulate experimentally an external variable such as deception (1969a) and to count nonverbal behavior as a dependent

measure (or series of measures). In a similar vein, Mehrabian (1971; Mehrabian & Ksionzky, 1970) counted the total frequency and duration of several coverbal behaviors in a standard interaction situation, using an experimental confederate, and grouped the behaviors via factor analysis into classes (such as "affiliation," "relaxation," and "immediacy") which describe the relationship between the interactants.

Some social psychologists have gone even further in this external-variable approach, and have manipulated the duration of a nonverbal behavior in order to observe the effect on another nonverbal or affective response. Argyle and Dean (1965), for example, found that interpersonal distance and eye contact combine at an optimum level for comfort, and Exline (1971), in a series of studies, related different levels of eye contact to sex, status, affiliation, and anxiety.

Both the structural and external-variable approaches lead to important insights about conversational interaction. The first permits the elucidation of the elements of microstructure which order the flow of conversation; the second takes cognizance of the large role in conversational interaction played by the social and affective relations between the participants. For this very reason, however, neither approach is adequate by itself. In addition, both approaches suffer from a second serious lack; neither has found a non-arbitrary behavioral unit into which to segment the data. Rather, researchers using the structural approach tediously analyze every bit of behavior in hopes that a unit of analysis will emerge, while workers manipulating external variables average frequency and duration across an entire interaction, neglecting the enormous variations which occur in the flow

of conversation. In recent years, a mixed approach has been developed, one which takes elements from both the other two and which bases its analysis on the naturally-occurring conversation turn.

Turn taking approach. As Kendon (1975) and Markel (1975) have pointed out, there is a common recognition that speakers in conversation rotate, or take turns, in an orderly way. For example, Kendon (1967) isolated a speaker glance at the listener as a cue to exchange of the floor, and Jaffe and Feldstein (1970) examined several types of exchange of the floor, or "switching pauses." The first explicit observation of the rules for turn sequencing, however, is of fairly recent vintage. Schegloff (1968) examined what kinds of turns could precede and follow each other in telephone conversations, and explored some of the consequences of breaking these sequencing rules. More recently, Wiemann and Knapp (1975), Duncan (1972), and Yngve (1970) have described several types of turn-holding, turn-yielding, and request-for-turn cues and in general have found an additive relationship between the occurrence of cues of a particular type and smooth exchange of the floor. In addition, both the content of turns and turn-taking rules have been related to race (LaFrance, Note 2; LaFrance & Mayo, 1976), language spoken (Gallois & Markel, 1975), and point in conversation (Erickson, 1975; Gallois & Markel, 1975).

Several definitions of the turn have been used in this research, some relying on content (Duncan, 1972; Wiemann & Knapp, 1975; Yngve, 1970), and some based strictly on the physical change of vocalization from one interactant to another (Jaffe & Feldstein, 1970; Markel, 1975). The definition used in the present study is of the latter type: a turn

is defined as beginning when an interactant begins vocalizing and ending when that interactant stops vocalizing, as long as the interactant engages in solo vocalization at some point. Since the turn presupposes at least a dyadic interaction, both the speaker and listener are encompassed within this unit. Listener behavior may include any amount of nonvocal coverbal behavior and simultaneous vocal behavior, while speaker behavior, by contrast, includes periods of silence, as long as these pauses are not filled by the speech of another interlocutor. In addition, each turn is associated with the exchange of the floor, or "switch," which follows it.

The advantages of segmentation in terms of the turn are obvious. First, as has been stated, it is a naturally-occurring and well-bounded unit. Second, it is small enough to permit study of the rules of interaction, but it may nonetheless be related to more general social-psychological aspects of the interaction. Finally, as will be seen in the next section, the turn can be used as the basis for different conceptualizations of the norms of conversational interaction.

The present study, therefore, focused on the association of several coverbal behaviors, within and between turns, and within and between participants in conversational interaction.

Theoretical Background

Models of Conversational Interaction

The methodological differences described in the preceding section result in part from two competing views of the nature of conversational interaction. One view, deriving from research on interactive synchrony (Condon & Ogston, 1966), emphasizes the simultaneous and overlapping

character of behavior in dyadic systems; Scheflen (1975) has argued for this view quite strongly. The other view, stemming from research on response sequences (Argyle, 1969) is concerned with the way the behavior of one interactant in a dyadic system can be used to predict that of the next person to act. Two models, a co-occurrence model resulting from the first view and a concatenous model coming from the second, their relation to behavioral synchrony, and hypotheses tested in the present study which were derived from them, are presented in this section.

Co-occurrence model. Saine (Note 1) has formalized this model in the following four propositions:

1. Communication involves simultaneous, non-linear, and overlapping behaviors. At any particular point in the course of a conversation, both speaker and listener may find themselves engaging in a number of behaviors; the initiation of a behavior by one person does not limit the options of the other.

2. The basic unit of social interaction is the speaking turn. The behaviors of speaker and listener are treated as the coordinates of a specific turn. They thus comprise the structure of that turn and, as such, can be compared to the behaviors occurring during another turn.

3. Similarity of behavior within a turn is reflective of the relationship between interactants. Individuals who share a common psychological orientation toward themselves or toward some object, concept, or other individual are likely to demonstrate their sameness in similar or complementary behaviors.

4. The more similar or complementary the behavior between interactants, the less frequent will be the instances of rule violation.

Behavioral coordination implies some evolution of normative behavior and an understanding among interactants of what actions constitute rule violations. Interactants whose behavior is not similar are more likely to have different perspectives on norms for behavior.

The co-occurrence model thus predicts that regularities between the coverbal behaviors of interactants are found within the same turn, and that, at least under certain circumstances, these behaviors are the same. In addition, it predicts that the extent of this regularity is inversely related to the number of rule-violations to be found. Evidence of one such rule violation is a simultaneous or overlong turn switch.

This model receives support from the research findings that participants in conversation synchronize their coverbal behavior very closely. Condon and Ogston (1966, 1967) found that body movements among interactants co-occurred within the same frame on film (that is, within the same 1/24 second); this co-occurrence was even more apparent when films taking 48 frames per second were utilized. The movements of both speaker and listeners also coincided with bursts of speech. Kendon (1970, 1972), using a similar frame-by-frame analysis, also found that listeners moved in time to the speech of the speaker, and, additionally, that speakers and listeners mirrored each other's movements. Finally, Duncan (1972) and Wiemann and Knapp (1975) were able to predict on the basis of the number of turn-yielding and request-for-turn cues at the end of one turn whether the transition to the next would be smooth or rule-violating; a high number of both types of cues was followed by a smooth switch, while a low number of request-for-turn cues combined with a high number of turn-yielding cues led to a long inter-turn silence. On the other

hand, a low number of turn-yielding cues (or several turn-maintaining cues) along with a high number of request-for-turn cues led to simultaneous speech.

Unfortunately, all of the research mentioned above has been conducted either on very small numbers of subjects or on small samples of behavior. It is encouraging that several studies have obtained the same results; still, an extension of the research is needed. In addition, the studies of synchronization have been of a very general kind; an examination of the synchrony between particular behaviors, as opposed to the coordination of any between-interactant body movements, seems in order.

Concatenous model. This model was formalized by Hawes (1973) as a set of propositions and related theorems. For convenience, it is partially restated here in the form of five propositions.

1. Communication is a spatio-temporal series of concatenous acts. Communication is distributed in a linear fashion with the responses in one turn acting as the stimuli for those in the next, which in turn act as the stimuli for the next turn. Communication acts are seen as contiguous and serial and constitute patterns of behavior.

2. The communication interact is the fundamental unit of analysis in the study of communication. Because of the emphasis on stimulus-response patterns in interaction, the focus is on pairs of turns. The interact may be defined as any two turns which are adjacent in time. In each interact, there is both an antecedent (first) and succeeding (second) turn. Each succeeding turn acts as the antecedent turn for the next interact; thus, interacts do not consist of isolated pairs of turns, but rather of a progression.

3. Communication functions to create and validate symbol systems which define social reality and regulate social action. Any communication involves the interactants in confirming the existence of common symbols and conversational norms and rules. Symbols and rules specific to the interaction may be created by one person, but they must be validated if they are to function in the interaction. At the same time, these rules and norms are required to perpetuate the relationship between interactants and to assist them in a meaningful exchange of information.

4. All communication interacts conceal, repeat, or disclose information about the relationships among symbol users enacting the symbol system. The way two individuals respond to each other is a symptom of their relationship. Any interact provides some insight into the patterns of responsiveness among interactants. An analysis of interacts throughout the entire conversation should provide a profile of the relationship between interacting parties.

5. The more negatively entropic the relationship, the greater the ease with which symbol systems can be enacted. The more negatively entropic the relationship, the easier it is for symbol users to interlock their communication acts in mutually expected and predictable ways. The easier this interlocking is, the less frequent should be the instances of rule violation.

The concatenous model predicts that regularities in coverbal behavior between interactants are found in interacts (that is, across two turns), and that for certain types of relationships, these behaviors will be the same. The extent of regularity and synchrony within an interact is inversely proportional to the number of rule violations related to that

interact. Therefore, the turn switch following an interact should be smooth if the interact contains synchronous behavior, and rule-violating if it does not.

There is research which supports the notion of regularity between turns. Bales (1950), analyzing meetings of five-man groups, found that each of his twelve content categories was regularly followed by only one or two of the other categories. Sometimes the category was the same (e.g., category 5, "giving opinion," was predictably followed by "giving opinion"); sometimes it was different. In the same vein, Jaffe (1964) showed that in psychotherapy sessions, patient and therapist use of specific words were positively correlated.

Studies of vocal coverbal behavior have resulted in similar findings. For example, Matarazzo (1965) found that patients match the length of their utterances to that of the therapist; however, Argyle and Kendon (1967) found that this effect is reversed when time constraints are severe. By the same token, when interviewers engage in long pauses or simultaneous speech in the context of the Chapple (1953) standard interview, interviewees do likewise (Argyle & Kendon, 1967; Matarazzo, Wiens, Matarazzo, & Saslow, 1968).

Although there is evidence of response regularities in vocal behavior, few studies of non-vocal coverbal behavior have been carried out within the framework of the interact. The model, however, is intended to be extended to all areas of communicative behavior, and a test of this kind would seem appropriate. This is especially true given the part played by non-vocal coverbal behavior in substituting for, embellishing, and regulating speech (Dittmann & Llewellyn, 1969; Ekman & Friesen, 1972; Kendon, 1970, 1972).

Similarities and differences of the two models. Both the co-occurrence and the concatenous models posit the intermeshing of coverbal behaviors between interactants in conversation. Both models also postulate that the consequent regularities follow general norms governing the relationship between the interactants (one of these norms, that of synchrony or response matching, is discussed below). Finally, both models predict rule violations like simultaneous or overlong switches of the floor when these norms are not followed and smooth interaction, including smooth switches (i.e., contiguous switches, where one interactant begins his or her turn as soon as the other has stopped speaking, but without simultaneous speech, and open switches, where there is only a short pause) when rules are adhered to.

The models differ, however, in their predictions about the time span in which regularities occur. The co-occurrence model postulates that the behavior of one interactant is predictable from that of the other within the same turn, and that this within-turn regularity leads to smooth exchange of the floor. For the concatenous model, this predictability exists across two adjacent turns. Thus, the major point of disagreement between the models is in their notion of what constitutes the basic unit of analysis in conversational interaction. The present study was in part an attempt to explore this disagreement.

Synchrony as a norm. Both of the models described above postulate that the behavior of interactants follows norms which govern their social relationship. The norm of synchrony, or what Miller (1964) called "response matching," seems a reasonable point of departure.

The positive correlation between similarity and attraction and the imitation in one's own behavior of the behavior of attractive or high-

status others are such well-established findings in the social-psychological literature as to constitute truisms (see Byrne, 1971, for a review of the literature on the first point and Bandura, 1962, for a review of the second). This similarity has a parallel in the tendency of communicators to produce similar verbal and nonverbal behavior in situations of solidarity and attraction. Indeed, the terms synchrony and response matching are most frequently used to indicate similarity of behavior, and they were used in this way in the present study. In addition to the studies mentioned in connection with the two models, most of which found synchrony between interactants, several examples can be given. Brown and Gilman (1960) found reciprocal use of the familiar form of the pronoun "you" in many European languages between people in situations of solidarity (same-age, same-class, etc.). Other analyses (Friedrich, 1966; Lambert, 1967; Slobin, 1963; see Ervin-Tripp, 1969, for a review) have replicated these findings and proposed definite rules for use of these pronouns. Analyses of address systems in American English (Brown & Ford, 1961; Ervin-Tripp, 1969) have also specified rules requiring similar titles in situations of solidarity. Lennard and Bernstein (1960) found that the types of utterances made by patients and therapists in psychotherapy sessions became more highly correlated with time and, they concluded, with increasing comfort. In the nonverbal area, Rosenfeld (1967) found that interviewees matched the smiling and nodding rates of interviewers. Scheflen (1973) also discovered that people in therapy sessions matched body postures and positions, particularly when they held favorable attitudes toward one another. Finally, Argyle, Lalljee, and Cook (1968) reported more interruption in dyads

where both members wore dark glasses, indicating the importance of mutual facing (eye contact) for smooth interaction.

In general, then, there appears to be a norm favoring synchronous behavior, particularly among interactants of the same age and social status who are acquainted with each other, as were the students in the present study. The question posed by the models described above is at what level this synchrony exists, and what its consequences will be.

Hypotheses derived from the co-occurrence and concatenous models. Hypotheses 1 and 2 are derived from the co-occurrence model.

1. Within the same turn, interactants in conversation are more likely to engage in synchronous coverbal behaviors than in other coverbal behaviors.

2. When conversational interactants engage in synchronous coverbal behaviors within the same turn, smooth switches of the floor are more likely to follow the turn than are rule-violating switches.

Hypotheses 3 and 4 come from the concatenous model.

3. Interactants in conversation are more likely to engage in synchronous coverbal behaviors than in other coverbal behaviors between two turns.

4. When conversational interactants engage in synchronous coverbal behaviors between two turns, smooth switches of the floor are more likely to follow the turns than are rule-violating switches.

Dyadic Composition and Sex Role

One factor which may influence the norm of synchrony discussed above is the sex of the interactants, or more specifically what has come to be called their sex role. The present study was not intended in any sense as a test of role theory; indeed, as Shaw and Costanzo (1970) have pointed out, role theory itself in its present state is more a system of classification and description than an organized body of postulates leading to testable hypotheses. Nonetheless, use is made of the term and concept

"sex role," so some relevant definitions drawn from various versions of role theory should be put forward.

Perhaps the most basic assumption of role theory is that human groups are structured into units called positions. Position has been defined (Biddle & Thomas, 1966) as a collectively-recognized category of persons who are differentiated on the basis of (1) some common attribute (such as age, race, or social class), (2) behavioral similarities (such as homosexual, athlete, or leader), (3) the behavioral reactions of others toward them (such as scapegoats), or (4) some combination of these (such as female athlete). Positions may thus be ascribed (sex, age, etc.), or they may be achieved (leader, physician, etc.). As Sarbin and Allen (1968) have stated, positions may be very general, in the sense that they have an influence on all behavior, and thus on other positions. On the other hand, positions may be quite specific. According to Sarbin and Allen, positions ascribed on the basis of biological attributes, such as sex and age, are very general, since they are occupied constantly and exert some influence on all behavior.

A great many positions in all social systems are ascribed, and biological sex is the simplest and most universally-used reference point for the ascription of position (Linton, 1936; Linton's term for position is "status"). According to Linton, all societies rely mainly on ascribed positions to take care of the ordinary business of living. Further, K. Davis (1966) has stated that ascribed position serves the very important function of providing the foundation for the socialization of the individual, the framework for the transmission of the cultural heritage, and the basis for the later assignment of the individual into

other positions. Indeed, the tradition in many societies of rites of passage from one ascribed position to another (boy to man or girl to woman) attests to the importance to society of this type of position.

There are some problems with the notion of position as it has been defined here, particularly when ascribed and achieved positions are dealt with at the same time. One difficulty which is especially relevant to the present study is that biologically-based positions cannot be entered or left by their occupants--they are assigned irrevocably at birth. One of the goals of role theory has been to describe positions (and their attached roles) completely independently of the characteristics of any particular occupant. In the case of positions attributed on the basis of sex, it is difficult to do this; since the occupants cannot leave their positions, confusion between their personal characteristics and characteristics of the role is likely. On the other hand, the considerations mentioned above point to the importance to social structure of ascribed positions based on biological attributes, and the language of role theory seems particularly well suited to explicating the function <u>in society</u> of this type of position as distinct from any real biological function the attribute on which ascription is based may have. Given the present lack of a systematic set of propositions in role theory, the solution, at least for now, may be to maintain the definition of position more or less as it stands, but to deal separately with ascribed and achieved position, keeping in mind that there are important and unresolved differences between them. That was the solution adopted in the present investigation; the only position dealt with was the ascribed one based on biological sex.

This position has attached to it a particular role. Once again, a definition is in order, and, indeed, a large number of definitions have been put forward. Role has been used to denote expectations about behavior, the behavior itself, or prescriptions about behavior, and it has been used as synonymous with position. Most definitions, however, can be seen to converge on the following two: Biddle and Thomas (1966) have defined role as the set of prescriptions defining what the behavior of a position member should be, and Sarbin and Allen (1968) have called role the organized set of behaviors that belongs to an identifiable position and which is activated when the position is occupied. Thus, role theorists have been concerned with three types of roles: expected role, the expectations and prescriptions held by others about what the behavior of a position occupant should be; perceived role, the expectations and prescriptions about the role held by the position occupant himself or herself; and enacted role, the behaviors which are actually engaged in when a position is occupied. Here again, it is important to keep in mind that these definitions are not the same. The present investigation was concerned with the effect on interaction of expected roles--that is, specifically with expectations held by others about the behavior of people occupying ascribed positions based on biological sex. The term sex role is used in this paper in this sense only.

Sex role, then, consists of a set of expectations about behavior. The sex role literature gives some indications about what these expectations are, and, in addition, indicates a surprising consensus about them among both men and women (Broverman, Broverman, Clarkson, Rosenkrantz, & Vogel, 1970; Sherriffs & Jarrett, 1953). For example,

Broverman, et al. (1970) have consistently found expectations that males will be objective, dominant, and independent (what they term the "competency cluster"), whereas females are expected to be submissive, subjective, and dependent; on the other hand, females are expected to be religious, quiet, neat, and sensitive (the "warmth-expressiveness cluster") and males are expected to be low on these traits.

This finding, that the male sex role is associated with dominance and the female sex role with submissiveness is very pervasive (Ellis & Bentler, 1973). In addition, sex roles in general, and this aspect of them in particular, are seen as complementary (Broverman, et al., 1970; Ellis & Bentler, 1973; Rosenkrantz, Vogel, Bee, Broverman, & Broverman, 1968). One might imagine, then, that expectations based on sex roles would be stronger when men and women interact and weaker when members of the same sex come into contact. Participants in mixed-sex interactions should begin the interaction with a preconceived idea of what the dominance relations will be. In same-sex interactions, on the other hand, these expectations should be lacking, and the dominance relations should have to be negotiated within the context of the interaction. If this is the case, one would expect mixed-sex groups to interact more smoothly and to follow the norm of synchrony more closely.

There is some evidence that mixed-sex and same-sex groups perform differently along these lines. Wyer and Malinowski (1972) found that members of same-sex dyads engaged in more competitive behaviors than did members of mixed-sex dyads. Hoffman and Maier (1961) found that mixed-sex groups were more efficient at solving problems of a logistical kind than same-sex groups. On the other hand, Clement and Schiereck

(1973) found same-sex groups to be more efficient at locating a target object. Finally, Luchins and Luchins (1955) and Reitan and Shaw (1964) found conformity to be greater in mixed-sex than in same-sex groups.

There is evidence, although it is not altogether straightforward, that the coverbal behavior of interactants in mixed-sex groups is different from that of same-sex groups. Prebor (1972), in a study of unconstrained conversations between members of male-male, female-female, and mixed-sex dyads, found more simultaneous speech in the female-female dyads, more imbalance between the two partners and a lower speech density in male-male pairs, and longer total conversation times in mixed-sex dyads. A study by Markel, Long, and Saine (in press) found that in male-male dyads there was a significant increase in simultaneous speech when subjects were placed at a far interpersonal distance; this increase did not occur in female-female or mixed-sex pairs. On the nonverbal channels, Exline (1971) found that females were more uncomfortable when stared at (100 percent of the interaction time) by a male, and particularly an older male, than by a female; however, the reverse was true for male subjects. In addition, Weitz (Note 3) found that females in mixed-sex dyads adjusted their nonverbal behavior to the dominance and affiliation needs of males, but this was not true of females in same-sex interactions or of males under any conditions.

Although the evidence is not totally clear, mixed-sex dyads seem to show a greater tendency to exhibit synchronous and smooth interactive behavior. Thus, one might anticipate differences of this same kind to affect the coverbal synchrony of interactants in conversation. Therefore, the following two hypotheses were included in the present

study:

5. Mixed-sex dyads are more likely than same-sex dyads to exhibit synchronous coverbal behavior within the same turn.

6. Mixed-sex dyads are more likely than same-sex dyads to exhibit synchronous coverbal behavior between two turns.

Hypotheses about One Interactant

Previous research on both verbal and nonverbal behavior has, in general, shown that people are fairly stable in their use of these behaviors, in spite of large inter-individual differences. The type/token ratio in writing, for example, is so stable that it can be used to differentiate between two writers. Some coverbal behaviors also seem to have this stable character. Jaffe and Feldstein (1970), for example, found that amount of vocalization and amount of pausing for a particular person vary relatively little across situations involving unconstrained conversation. Saslow and Matarazzo (1959) reported similar findings for an interview situation. Kendon and Cook (1969) and Libby (1970) both found that subjects were quite consistent in their patterns of facing (gaze direction) across different partners. It is probably the case, therefore, that a given interactant's behavior in a particular turn can be predicted from what he or she has already done, over and above any changes in behavior that result directly from the interaction. If measuring the occurrence or non-occurrence of coverbal behavior within a turn is a viable technique, it should be able to detect this regularity. Hypothesis 7 was an attempt to take this into account.

7. The occurrence of a particular coverbal behavior by an interactant in one turn is more likely to be followed by the same behavior in the next turn than by another coverbal behavior.

The change in role relationships between same-sex and mixed-sex dyads, however, is probably great enough to disrupt this predictability to some extent, or at least to alter the manner in which it functions. If the role relationships in same-sex dyads are more situation-specific than those in mixed-sex dyads, as has been argued, each interactant's behavior should be affected by the negotiations and conflicts that take place in one case and not in the other. Hypothesis 8 follows:

8. There are differences between same-sex and mixed-sex dyads in the regularity of one interactant's coverbal behavior across two turns.

Summary: The Present Study

The present study, then, had as its major purpose an exploration of the manner in which various coverbal behaviors are paired within one turn and across two turns, for one interactant and for the dyad. The investigation was conducted within the context of two-person conversations between people who are acquainted with each other, and the data consisted of the occurrence or non-occurrence of several coverbal behaviors in each conversation turn. In addition, an attempt was made to examine the adequacy of the turn as the unit of analysis in face-to-face interaction, and to this end, two turn-based models of interaction were compared. Finally, differences in coverbal behavior related to the role structure of same-sex and mixed-sex dyads were predicted. This study was an exploratory one in an area which is only beginning to explore the intricacies of so simple an activity as conversation.

CHAPTER II

METHOD

Subjects

Twelve male and twelve female students enrolled in introductory speech courses at the University of Florida volunteered to participate in this study. Their ages ranged from 18 to 27 years; the average age was 20.3 years. Two males and two females were selected from each introductory speech class; these subjects constituted one experimental group. It was ascertained that the members of each group were acquainted with each other only within the context of their discussions in the speech class.

Materials

Conversations between pairs of subjects were recorded in a carpeted room with dimensions of approximately 10 x 15 feet. The room contained a padded and covered card table and two comfortable chairs, placed diagonally across from each other at the table, and at a 45° angle to the camera, which was located about 12 feet away. A microphone was mounted on a stand just behind the table. A copy of a "discussion problem" was secured to the card table in front of each subject's chair. Videotaping was done with a Sony AV 3600 Videocorder and a Sony 3210 video camera equipped with a zoom lens. Time signals were superimposed onto the videotape after the experiment was run by means of an Odetics Video Timer Model VTG 33.

In the break between conversations, subjects completed the following materials: Schutz' FIRO-B scale, Ziller's Self Concept Inventory, and two semantic differential-type questionnaires concerning their feelings about the conversations (these measures were not used in the present study).

Procedures

Each experimental group of four subjects (two males and two females) was assigned a time for the experimental session. After all four subjects had arrived at the laboratory, one experimenter explained that the purpose of the experiment was to study conversations about problems of current social interest, that each of them would participate in two conversations, and that the conversations would be videotaped. At that point, the subjects filled out consent forms.

A second experimenter then took two of the subjects into the recording room and seated them at the table. The experimenter started the camera and recorder, identified the subjects by number, and told them they were to read the problem that was placed in front of them on the table. Both discussion problems involved a young couple, but in one version the couple was contemplating having an abortion, and in the other they were facing a problem resulting from their living together. The texts of these two discussion problems are presented in Appendix A. The experimenter asked the subjects to discuss the problem until they had agreed upon a solution, informed them that they could talk for as long as they liked, and left the room.

At the end of the conversation, the experimenter stopped the videotape and took the subjects to an adjoining room. The other two subjects were then shown into the recording room, and the process described above

was repeated. Meanwhile, the first two subjects completed half the questionnaires described above.

When the second pair of subjects had completed their conversation, one of the first couple was paired with one of the second, and vice versa; the entire process was then repeated. Finally, all subjects filled out background forms.

Half of the subjects discussed the "abortion" problem and half discussed the "living-together" problem in their first conversation. Similarly, half of the subjects had their first conversation with a partner of the same sex, and half began with a partner of the opposite sex.

Data Reduction

A digital timing signal measuring in tenths of a second was superimposed onto the videotape of each conversation. Monitors were trained to track the following coverbal behaviors: turns, pauses, facing, left- and right-hand movement, left- and right-hand body touching, head tilt, head nods, head shakes, and body shifts. Operational definitions of these behaviors are provided in Table 1.

Monitors first watched the videotape at normal speed and recorded as accurately as possible (usually within $\pm$ 1.0 second) each time the behavior they were tracking occurred. Then, using these rough recordings as a guide, they watched again in slow motion (at approximately 1/15 normal speed) and recorded the beginning and end of each occurrence of the behavior to the nearest 0.1 second. In the case of head nods, head shakes, and body shifts, beginning and end times were not recorded. Rather, a time was determined which was as close as possible to the onset of each occurrence of the behavior, and that time was recorded. Each subject was monitored separately,

TABLE 1

COVERBAL BEHAVIORS

Behavior	Definition
1. Turn	Begins when one speaker starts talking and ends when the other speaker starts solo talking.
2. Pause	A silence between vocalizations by the same speaker which lasts at least 1.0 seconds.[a]
3. Facing	Subject's nose is pointed roughly at the center of partner's face.
4. Right hand movement	Any movement of subject's right hand and wrist, unless it results from a movement of the whole torso.
5. Left hand movement	Any movement of subject's left hand and wrist, unless it results from a movement of the whole torso.
6. Right hand body touching	Any part of subject's right hand touching any part of body.
7. Left hand body touching	Any part of subject's left hand touching any part of body.
8. Head tilt	Subject's eyes not in horizontal plane.
9. Head nod	Up-and-down movement of subject's head.
10. Head shake	Side-to-side movement of subject's head.
11. Body shift	Movement of subject's entire torso from one position to another.
12. Speaking turn[b]	Having the floor (beginnings and endings the same as for turns).

[a]1.0 second was used as the lower limit because it was determined (Markel, Gallois, & Markel, Note 4) that this represents the shortest intra-speaker silence which untrained listeners reliably recognize as a pause.

[b]This behavior was identified from the results of the tracking.

and only one coverbal behavior at a time was tracked. Thus, each conversation was viewed a total of 22 times.

Turn and pause beginnings and ends were tracked in the same manner as the other coverbal behaviors, except that slow-motion tracking was done at 1/2 normal speed. Monitors were aided in tracking by verbatim transcripts of the conversations. Simultaneous speech was not tracked except when it resulted in an exchange of the floor. After the turn beginnings and ends were tracked, the speaker and listener in each turn were identified, and the turns were appropriately marked.

Derived Measures

The results of the tracking made it possible to determine which coverbal behaviors, by either the speaker or the listener, occurred in each turn. A computer program was developed which made it possible to calculate the length of the silence between the end of one turn and the beginning of the next. These "switches" of the floor were categorized as follows: Long--duration >1.5 seconds; Open--duration from 0.1 to 1.5 seconds; Contiguous--duration = 0.0 seconds; and Overtalk--the second interactant begins his or her turn before the first has stopped talking.

Table 2 lists six "types of pairing": Packaging, Co-occurrence, Concatenous, Co-occurrence + switch, Concatenous + switch, and Chaining. The dependent measures used in this study represent the number of turns, or turn pairs, in which a particular type of pairing occurred, divided by the total number of turns or turn pairs.

It will be noted that, according to the definitions in Table 2, two behaviors are considered to be paired whenever both occur or whenever neither occurs. This second consideration may seem strange at first, but

TABLE 2

TYPES OF PAIRING

I. Packaging: within-subject within-turn

Behavior 1[a] and behavior 2 either both occur or neither occurs for the same subject within the same turn.

II. Co-occurrence: between-subjects within-turn

Either behavior 1 by one partner and behavior 2 by the other partner both occur or neither occurs, within the same turn.

III. Concatenous: between-subjects between-turns

Either behavior 1 by one partner in one turn and behavior 2 by the other partner in the next turn both occur or neither occurs.

IV. Co-occurrence + switch

Either behavior 1 by both partners in the same turn is followed by a particular switch[b], or neither behavior 1 nor that switch occurs.

V. Concatenous + switch

Either behavior 1 by one partner in one turn and by the other partner in the next turn are followed by a particular switch, or behavior 1 does not occur and that switch does not occur.

VI. Chaining: within-subject between-turns

Either behavior 1 occurs in one turn and behavior 2 occurs in the next turn or neither occurs, for the same subject.

[a]Behaviors 1 and 2 may be any of the coverbal behaviors, including the same one.

[b]The switch may be Long, Open, Contiguous, or Overtalk.

it results from the notion, which has been long and widely used in the study of nonverbal behavior, that not to behave is to behave (Chapple, 1939). For example, if two interactants in conversation both choose to hold their hands still, they have chosen to do the same thing as much as if they had both chosen to move their hands. This choice becomes even more obvious when one considers the definitions of the behavior studied (see Table 1). Not to face, for example, means to point the face away from the partner; not to tilt the head means to hold the head straight, and so forth. Thus, behaviors are paired both when they do and when they do not occur.

Two coverbal behaviors, pausing and speaking turns, sometimes cannot be paired and sometimes must be paired. That is, both partners cannot be speakers, and therefore cannot pause, within the same turn. Speaking turn-speaking turn and pausing-pausing, therefore, are not part of the Co-occurrence measures. Pausing and speaking must be paired in sequential turns, however, and so were also eliminated from the Concatenous measures. Finally, by definition, speaking by the same subject (or pausing by the same subject) cannot occur in two turns in succession, and so they were eliminated from the Chaining measure.

The pairing measures, before being entered into the analyses described below, were corrected for the number of pairings to be expected by chance, using the statistic kappa (see Fleiss, 1975, for a discussion of this type of measure and correction statistics).

Reliability

Inter-monitor reliability was determined by having a second team of monitors retrack a 30-second segment of each conversation and determining the occurrence or non-occurrence of each behavior in each turn using the

procedures described above. The percentage of agreement between the original and reliability teams and a reliability coefficient based on the statistic k_w (Cohen, 1968) were calculated, and they are presented in Appendix B. Agreement between the teams ranged from 88 to 98 percent.

CHAPTER III

RESULTS

Pairing Type I: Packaging

The pairing of coverbal behaviors for each subject within the same turn was computed in order to determine which coverbal behaviors usually appear together (Packaging). In addition, the number of turns in which each of the coverbal behaviors appeared at all was counted, so as to discover which behaviors almost never occurred and which could be found in almost every turn. The number of conversations in which different coverbal behaviors were paired at least 70 percent of the time, as well as the number of conversations in which each coverbal behavior was present in less than 10 percent of the turns or in more than 90 percent of them, were tabulated. The results of this procedure are presented in Appendix C.

On the basis of these results, head shakes and body shifts were removed from further analysis, since in half or more of the subjects, they appeared in less than 10 percent of the turns; right-hand and left-hand body touching were eliminated because they appeared in more than 90 percent of the turns for at least half of the subjects. It was also decided to combine left- and right-hand movement, since they were paired at least 70 percent of the time in 36, or 3/4, of the subjects. Thus, <u>any</u> hand movement was counted as an occurrence of the behavior. Pauses and head nods also appear to be paired very frequently (at least 70 percent of the time in 41 of the subjects). Part of this pairing, however, is

artifactual, in that pauses can only occur in half the turns, that is, the speaking turns. For this reason, and because both pauses and head nods have been studied fairly frequently in the past without being linked, they were both retained in the analysis.

In sum, the analysis of the type I pairing (Packaging) reduced the number of coverbal behaviors in the analysis to six: pausing, speaking turn, facing, hand movement, head tilt, and head nods. These six coverbal behaviors were then analyzed in terms of the five other types of pairing: Co-occurrence, Concatenous, Co-occurrence + switch, Concatenous + switch, and Chaining.

Pairing Type II: Co-occurrence

In order to test the first hypothesis, that within the same turn interactants are more likely to engage in similar than in dissimilar coverbal behaviors, data were analyzed by means of a Friedman two-way analysis of variance by ranks (Siegel, 1956). Treatment conditions were the six coverbal behaviors which could be executed by one partner. Separate analyses were conducted for same-sex and mixed-sex dyads, and for each coverbal behavior which could be executed by the other partner within the same turn. The results of this analysis are presented in Table 3.

As was indicated in the Introduction, researchers in the field of nonverbal behavior are still working towards a methodology for studying conversational interaction, and thus a conservative interpretation of the data is advisable. This is especially true in view of the frequent failure to replicate results, sometimes even when only a slight change is made in the time unit on which data are analyzed (see Bein, 1974).

TABLE 3

PAIRING TYPE II: CO-OCCURRENCE--RESULTS OF THE FRIEDMAN ANOVAS BY RANKS

Behavior	Same-Sex Dyads[a]			Mixed-Sex Dyads[a]		
	Chi-square	df	p	Chi-square	df	p
Pause	1.0	3	ns	3.2	3	ns
Speaking Turn	5.2	3	ns	13.1	3	ns[b]
Facing	20.7	5	.001	36.9	5	.001
Hand Movement	12.4	5	ns[b]	30.0	5	.001
Head Tilt	13.8	5	ns[b]	26.6	5	.001
Head Nods	13.2	5	ns[b]	25.6	5	.001

[a] $N = 12$

[b] p is less than .05 but greater than .001. These results are reported as trends.

Because of this, and especially given the large number of analyses performed in the present study, significance level was set at p .001, and only results which reached this level are reported as significant. When this procedure is adopted, however, the possibility of a Type II error looms large; therefore, results which reached conventional significance levels are reported as trends.

Significant Results

In the same-sex conversations, a significant chi-square was found for facing. Follow-up tests using the Nemenyi procedure (Kirk, 1968), with alpha = .05, indicated that facing was significantly more likely to accompany the other partner's facing in the same turn than was speech.

In the mixed sex-dyads, significant chi-squares were obtained for facing, hand movement, head tilts, and head nods. Follow-up tests indicated that facing was more likely to be accompanied by partner's facing than by either hand movement or speech, and facing was also more likely to appear with partner's head nods than with speech. Hand movement, on the other hand, was significantly more likely to be paired with partner's hand movement and pausing than with speech. Finally, head nods were significantly more likely to be accompanied by head nods and by pausing than by speech; they also co-occurred more often with pausing than with head tilts. Thus, the first hypothesis received support.

Trends

In the same-sex dyads, trends indicated that hand movement was more likely to co-occur with partner's hand movement than with any other behavior, that head nods were most likely to co-occur with head nods, and that head tilt was more likely to co-occur with hand movement and facing than with the other behaviors.

In the mixed-sex dyads, a trend indicated that speech by one partner was more likely to co-occur with facing by the other partner than by any other behavior.

Pairing Type III: Concatenous

A Friedman two-way analysis of variance by ranks was conducted in order to test the third hypothesis, that across two turns interactants are more likely to engage in similar than in dissimilar coverbal behaviors. Treatment conditions represented the six coverbal behaviors which could occur in the second turn, and alpha was again set at the .001 level. Separate analyses were carried out for each coverbal behavior which could be executed in the first turn, and for same-sex and mixed-sex dyads. Results are presented in Table 4. As can be seen, no significant chi-squares were found for either same-sex or mixed-sex conversations; hence, the third hypothesis was not supported. However, several trends did appear.

In the same-sex dyads, trends indicated that pausing by one partner was more likely to be followed by pausing by the other partner in the next turn than by the other behaviors. Hand movement, on the other hand, was most likely to be followed by speech.

In the mixed-sex dyads, trends indicated that facing was most likely to be followed by facing by the other partner in the next turn; on the other hand, hand movement was most likely to be followed by speech, and head tilt was most likely to be followed by speech.

Pairing Type IV: Co-occurrence + Switch

In order to test the second hypothesis, that when interactants engage in similar coverbal behavior within the same turn, smooth switches

TABLE 4

PAIRING TYPE III: CONCATENOUS--RESULTS OF THE FRIEDMAN ANOVAS BY RANKS

Behavior	Same-Sex Dyads[a]			Mixed-Sex Dyads[a]		
	Chi-square	df	p	Chi-square	df	p
Pause	11.5	4	ns[b]	7.2	4	ns
Speaking Turn	2.7	3	ns	7.0	3	ns
Facing	7.5	5	ns	14.9	5	ns[b]
Hand Movement	12.3	5	ns[b]	19.6	5	ns[b]
Head Tilt	6.5	5	ns	18.6	5	ns[b]
Head Nods	6.6	5	ns	6.1	5	ns

[a]N = 12

[b]p is less than .05 but greater than .001. These results are reported as trends.

of the floor are more likely to follow the turn than are rule-violating switches, a Friedman two-way analysis of variance by ranks similar to that done for the Co-occurrence measures was again conducted. Treatment conditions represented the four types of switches which could follow the turn: Long, Open, Contiguous, and Overtalk. Results are presented in Table 5. No significant chi-squares and no trends were found for any coverbal behavior in either same-sex or mixed-sex dyads. Thus, the second hypothesis was not supported.

Pairing Type V: Concatenous + Switch

An analysis similar to that conducted for Co-occurrence + switch (pairing type IV) was done. Treatment conditions represented the four types of switches which could follow the second turn in the pair. Results are presented in Table 6. Again, no significant chi-squares and no trends appeared for either same-sex or mixed-sex dyads. The fourth hypothesis, thus, was not supported.

Pairing Type VI: Chaining

To test the seventh hypothesis, that interactants are more likely to follow a coverbal behavior in one turn by the same coverbal behavior in the next turn than by any other behavior, data were once again analyzed by means of a Friedman two-way analysis of variance by ranks. Treatment conditions represented the six coverbal behaviors which could occur in the second turn in the chain. As before, separate analyses were carried out for same-sex and mixed-sex dyads, and a separate analysis was done for each of the six coverbal behaviors which could occur in the first turn in the chain. Results of this analysis are presented in Table 7.

Significant Results

As can be seen, a significant chi-square was found for head tilt in

TABLE 5

PAIRING TYPE IV: CO-OCCURRENCE + SWITCH--RESULTS OF THE FRIEDMAN ANOVAS BY RANKS

Behavior	Same-Sex Dyads[a]			Mixed-Sex Dyads[a]		
	Chi-square	df	p	Chi-square	df	p
Facing	6.0	3	ns	1.1	3	ns
Hand Movement	4.5	3	ns	2.2	3	ns
Head Tilt	2.4	3	ns	3.2	3	ns
Head Nods	0.6	3	ns	2.6	3	ns

[a]N = 12

TABLE 6

PAIRING TYPE V: CONCATENOUS + SWITCH--RESULTS OF THE FRIEDMAN ANOVAS BY RANKS

Behavior	Same-Sex Dyads[a]			Mixed-Sex Dyads[a]		
	Chi-square	df	p	Chi-square	df	p
Pause	0.5	3	ns	3.9	3	ns
Facing	4.3	3	ns	3.6	3	ns
Hand Movement	1.4	3	ns	1.7	3	ns
Head Tilt	4.0	3	ns	2.6	3	ns
Head Nods	3.1	3	ns	2.1	3	ns

[a]N = 12

TABLE 7

PAIRING TYPE VI: CHAINING--RESULTS OF THE FRIEDMAN ANOVAS BY RANKS

Behavior	Same-Sex Dyads[a]			Mixed-Sex Dyads[a]		
	Chi-square	df	p	Chi-square	df	p
Pause	1.9	3	ns	3.2	3	ns
Speaking Turn	2.5	3	ns	12.6	3	ns[b]
Facing	19.7	5	ns[b]	22.7	5	.001
Hand Movement	10.1	5	ns	29.0	5	.001
Head Tilt	26.3	5	.001	20.9	5	.001
Head Nods	2.7	5	ns	21.3	5	.001

[a]N = 12

[b]p is less than .05 but greater than .001. These results are reported as trends.

the same-sex conversations. Follow-up tests using the Nemenyi procedure indicated that head tilts in one turn were significantly more likely to be followed in the next turn by head tilts than by pausing, speaking, or head nods.

In the mixed-sex conversations, significant chi-squares were found for facing, hand movement, head tilts, and head nods. Follow-up tests indicated that facing was significantly more likely to be followed by facing than by either pausing or hand movement. In addition, hand movement was significantly more likely to be followed by hand movement than by speech, head tilts, or head nods; and head tilts were significantly more likely to be followed by head tilts than by speech or head nods. Thus, the seventh hypothesis was supported. However, head nods were significantly more likely to be followed by pausing in the next turn than by either speech or head nods.

Trends

In the same-sex dyads, a trend indicated that interactants were more likely to chain facing in one turn with facing in the next than with any other behavior.

In mixed-sex dyads, a trend indicated that interactants were more likely to follow their speaking turns with facing in the next turn.

Composition of Dyads

The fifth and sixth hypotheses stated that mixed-sex dyads are more likely than same-sex dyads to engage in similar coverbal behaviors within one turn and across two turns. The eighth hypothesis predicted differences in the extent of synchrony for one interactant across two turns, without specifying the direction of the difference. These hypotheses were tested by means of the Sign Test (Siegel, 1956).

Co-occurrence

The Co-occurrence score received by each subject in his or her same-sex conversation was compared to the score in the subject's mixed-sex conversation. Separate tests were carried out for each pair of similar behaviors: facing-facing, hand movement-hand movement, head tilt-head tilt, and head nods-head nods. The results are presented in Table 8. As can be seen, no significant differences between same-sex and mixed-sex conversations were found for any coverbal behavior. All results, however, were in the predicted direction. The fifth hypothesis, nonetheless, was not supported.

Concatenous

Each subject's score in the same-sex conversation on the Concatenous measure was compared with his or her score in the mixed-sex conversation. Again, separate tests were conducted for all similar pairs. The results are reported in Table 9. Again, no significant differences in extent of synchrony between same-sex and mixed-sex dyads were found for any coverbal behavior.

A trend indicated that mixed-sex dyads synchronized their pauses across two turns to a greater extent than did same-sex dyads. In addition, results for all behaviors were in the predicted direction. These results, however, did not support the sixth hypothesis.

Chaining

Once again, each subject's score on the Chaining measures in the same-sex conversation were compared with his or her scores in the mixed-sex conversation; the results appear in Table 10. No significant differences in the extent of synchrony between same-sex and mixed-sex dyads were found. Thus, the eighth hypothesis was not supported.

TABLE 8

PAIRING TYPE II: CO-OCCURRENCE--RESULTS OF THE SIGN TESTS FOR SYNCHRONY

Behavior	N	Number of Positive Differences[a]		p
		Same-Sex Dyads	Mixed-Sex Dyads	
Facing	24	9	15	ns
Hand Movement	23	10	13	ns
Head Tilt	24	9	15	ns
Head Nods	24	10	14	ns

[a]A positive difference indicates greater synchrony.

TABLE 9

PAIRING TYPE III: CONCATENOUS--RESULTS OF THE SIGN TESTS FOR SYNCHRONY

Behavior	N	Number of Positive Differences[a]		p
		Same-Sex Dyads	Mixed-Sex Dyads	
Pause	24	7	17	ns[b]
Facing	23	8	15	ns
Hand Movement	23	11	12	ns
Head Tilt	24	8	16	ns
Head Nods	23	10	13	ns

[a]A positive difference indicates greater synchrony.

[b]p is less than .05, but greater than .001. This result is reported as a trend.

TABLE 10

PAIRING TYPE VI: CHAINING--RESULTS OF THE SIGN TESTS FOR SYNCHRONY

Behavior	N	Number of Positive Differences[a]		p
		Same-Sex Dyads	Mixed-Sex Dyads	
Facing	23	12	11	ns
Hand Movement	24	12	12	ns
Head Tilt	24	15	9	ns
Head Nods	24	14	10	ns

[a]A positive difference indicates greater synchrony.

CHAPTER IV

DISCUSSION

This chapter consists of seven sections. The first constitutes a brief summary of the results. The next three sections discuss these results in more detail as they relate to the co-occurrence and concatenous models, the predictions of differences in synchrony as a function of the sexual composition of dyads, and regularities in the behavior of one interactant. After this, the relevance of the results to the construction of a typology of turns is considered. In the final two sections, the methodology of the study is discussed, and the entire chapter is summarized.

Summary of Results

1. Synchrony within one turn (Co-occurrence measures). In same-sex dyads, partners were more likely to pair facing with facing than with any other coverbal behavior. In addition, there was a trend which indicated that hand movement was paired with hand movement and head nods were paired with head nods. In mixed-sex dyads, results indicated that partners synchronized their facing, hand movement, and head nods. Thus, the first hypothesis, that interactants synchronize their coverbal behavior within one turn, received support.

2. Other results for the Co-occurrence measures. In same-sex dyads, a trend indicated that partners paired head tilts by one person with hand movement and facing by the other within the same turn. In mixed-sex dyads, on the other hand, results showed that partners paired head tilts by one

person with pausing by the other; hand movement and head nods by one person were also paired with pausing by the other.

3. Synchrony between turns (Concatenous measures). No significant results were obtained for these measures, so that the third hypothesis, that interactants synchronize their coverbal behavior between two turns, was not supported. Trends indicated, however, that pausing by one person in one turn was followed by pausing by the other in same-sex dyads. Similarly, a trend indicated that facing was followed by facing in mixed-sex dyads.

4. Other results for the Concatenous measures. Although there were no significant results, trends indicated that interactants in mixed-sex dyads tended to follow hand movement and head tilts by one person in one turn with a speaking turn by the other person. This indicates that hand movement and head tilts occurred in the person's own speaking turn.

5. Switches of the floor. Results did not show any relation between synchrony on any coverbal behavior, either within or between turns, and any switch type. Thus, the second and fourth hypotheses, which predicted such relationships, were not supported.

6. Composition of dyads. In spite of the differences between mixed-sex and same-sex dyads reported above, results did not indicate any significant differences between the two types of dyads in the extent of synchrony for any coverbal behaviors, either within or between turns, with one exception: there was a trend indicating that mixed-sex dyads synchronized their pauses across two turns more than did same-sex dyads. In addition, all of the results for both the Co-occurrence and the Concatenous measures were in the predicted direction, although none

reached significance. Nonetheless, the fifth and sixth hypotheses, which predicted greater synchrony in mixed-sex than in same-sex dyads, were not supported.

7. Synchrony for one interactant (Chaining measures). In the same-sex dyads, results indicated that an interactant was likely to pair head tilts in one turn with head tilts in the next turn. In addition, a trend indicated that facing in one turn was likely to be followed by facing in the next turn. For mixed-sex dyads, interactants were likely to pair their own facing with facing, hand movement with hand movement, and head tilts with head tilts between two turns. Thus, the seventh hypothesis, that interactants synchronize their own behavior between turns, received support. However, there were no differences between interactants in mixed-sex and same-sex dyads in the extent of synchrony between two turns for any coverbal behavior, so that the eighth hypothesis, which predicted such differences, was not supported.

8. Other results for the Chaining measures. Two final results appeared for the Chaining measures. Interactants in mixed-sex dyads were more likely to follow their own head nods in one turn by pausing in the next turn than by any other coverbal behavior. Lastly, in mixed-sex dyads, interactants were most likely to follow their speaking turns with facing in the next turn, thus indicating that facing is likely to appear as a listener behavior.

Findings Relevant to the Models

Synchrony

Clearly, the synchronization of behavior which has been found in previous research on interaction in natural groups, and which is predicted

by both the co-occurrence and the concatenous models in situations like the one in the present study, has been replicated here. Nevertheless, the behavioral units for which the models make their predictions, and which constitute their main point of difference, do not seem to be tapping this synchrony to the same extent.

The prediction by the co-occurrence model that interactants will synchronize their coverbal behavior within the same turn was supported in the present investigation. In same-sex dyads, one partner was likely to face in a given turn if the other did; mixed-sex dyads synchronized their facing, hand movement, and head nods. In addition, a trend was found in the same-sex dyads for this same synchronization of hand movement and head nods. Thus, in mixed-sex dyads (and less certainly in same-sex dyads), all of the coverbal behaviors studied except head tilt were synchronized within the same turn.

For the concatenous model, however, the situation is somewhat different. No significant regularities were found across two turns (that is, within one interact) for any coverbal behaviors, and thus the model's prediction of synchronization of behavior was not supported. Some comment on the results which did appear nonetheless seems warranted, particularly since they indicate an interesting difference between the turn and the interact.

Of all the coverbal behaviors studied, only facing in mixed-sex dyads and pausing in same-sex dyads showed trends toward synchrony between turns. All of the other behaviors which resulted in any regularities across two turns (i.e., hand movement in same-sex dyads, and hand movement and head nods in mixed-sex dyads) were most likely

to be followed by the partner's speaking turn, and thus occurred in the person's own speaking turn. Pausing seems to have a special function in conversation which will be discussed in a later section. Facing, on the other hand, has been linked in previous research to both listener and speaker (Exline, 1971; Kendon, 1967), and the strong evidence found in the present study that interactants synchronize their facing within the same turn gives further evidence of this association. What the concatenous measures are picking up, therefore, could be a difference in the behaviors associated with the speaker and the listener, where hand movement and head tilt are associated with the speaker, and facing is associated with both speaker and listener.

Interacts, therefore, appear to be related to speaker-listener exchange, and thus with the verbal behavior in conversational interaction. Indeed, interacts have been used successfully in the past to explore regularities in verbal interactions (Amidon, 1970; Bales, 1950). There would appear to be every reason to continue this research, perhaps with a view to linking particular coverbal behaviors to verbal behavior including the content of speaking turns and, through content, to other aspects of the relationship between interactants.

When coverbal behavior is analyzed without reference to content, however, the co-occurrence model, with the turn as a base, appears to be a better predictor of the kinds of regularities that exist in conversation and the norms which govern them. Participants in conversation who are similar to each other (same-age, same-occupation--in this case, speech students) seem to follow a norm of behavior synchrony within the same time unit, even though they are engaging in different verbal activities

(one is speaking and one is listening). This synchrony, then, would appear to be confirming the social or affective aspects of their relationship, rather than constituting a part of their conversational tasks. In previous research, Condon and Ogston (1966) pointed out this possibility when they described a child, in conversation with both his parents, who switched his behavioral synchronization from the behavior of one parent to that of the other as he changed allegiances. The Condon and Ogston findings are based on a case study in a psychotherapeutic setting, and the present study gives evidence of the generality of their findings.

In general, then, the co-occurrence model seems to be superior to the concatenous model in predicting how participants in conversation synchronize their coverbal behavior. This model would lend itself readily to systematic study of the influence of social and situational variables (for example, characteristics of the subjects, status differences, and variations in setting) on synchrony. For example, the co-occurrence model predicts that in dyads where attraction or compatibility is low, synchrony does not occur. Studies which manipulate this variable and study its effect on the synchronization of coverbal behavior within turns can be easily designed and would probably provide a fruitful means of expanding and refining the model.

The co-occurrence model, moreover, could be further refined by examining the relative extent of synchrony in different coverbal behaviors. The results of the present investigation indicate that facing, hand movements, and head nods tend to be synchronized. However, a direct test of whether one of them is synchronized more consistently than the others, or whether synchrony on one behavior is a harbinger of

synchrony on several others, awaits future investigations. Examination of the model's ability to make accurate predictions involving adherence to other norms of conversational interaction is also left for the future.

The results of the present study shed light on a further aspect of conversational interaction which deserves comment here. Synchronization of behavior within a turn is a dyadic process, one which requires co-ordination of behavior by both participants, rather than a response by one partner to a simulus presented by the other. The existence of this dyadic process is implied by both the co-occurrence and the concatenous models, and others have also insisted on its importance (Kendon, 1975; Scheflen, 1975). The results of this study give further evidence of the advantages of a dyadic approach to the analysis of conversational interaction. Future research designs, therefore, should take the dyadic nature of interaction into account. If participants in conversation do synchronize their behavior, and if they follow other norms of a similar kind, it is not reasonable to assume, for example, that a confederate can act as a constant stimulus producing responses from subjects which bear on characteristics of the subjects. Even if the confederate can stabilize his or her behavior across subjects, which is not obvious given the as-yet unknown dyadic norms that may be in effect, the subject's behavior will still be a function of the relationship between the two, and not merely a response to the confederate. It would seem advisable, therefore, to design research with these considerations in mind. This is not to say that the characteristics of the interactants are not an important influence on the interaction, but rather that the characteristics exert their influence mutually and within the framework of rules which govern the interaction itself.

Switches of the Floor

The results of the present study do not support the predictions of either the co-occurrence or the concatenous model as to the relationship between synchrony of behavior within a turn or interact and the exchange of the floor which follows that turn or interact. Several possible reasons for this observed lack of association should be mentioned.

First, the measures used in the present study may not be sufficiently fine to detect the behaviors which determine switches of the floor. Several researchers (Duncan, 1972; LaFrance & Mayo, 1976; Wiemann & Knapp, 1975) have indicated that speaker and listener behavior just before exchange of the floor are the most important determinants of the switch. If this is the case, the units proposed by both models are too gross to enable the elucidation of the rules governing turn switches, and a smaller unit must be found to deal with this aspect of conversation. On the other hand, it is possible that the amount of synchronous behavior within a turn, rather than the mere occurrence of this behavior, is a good predictor of the kind of switch which will follow. In this case, the co-occurrence model still provides a viable framework for studying turn switches, but the pairing measures used in the present study are not yet sufficiently fine for this use.

Second, there may be norms or situational variables linked to the relationship between interactants which are relevant to the exchange of the floor, but behavioral synchrony may not be one of them. For example, there is some evidence that the total amount of some coverbal behaviors is related to attraction and comfort (Argyle & Dean, 1965; Exline, 1971); these behaviors also may be related to the switches of the floor which take place. In other words, too much of a behavior may

cause discomfort and thus lead to rule violations in exchange of the floor. The present study does not deal with these other aspects of interaction, but they can easily be examined from the perspective of either the co-occurrence or the concatenous model.

Third, it may be that switches of the floor are governed by conversational rules which have nothing to do with the relationship of the interactants, but which are part of a conversational competence analogous to the linguistic competence described by Chomsky (1965). The overwhelming majority of switches are of the open type (that is, they consist of a silence ranging in length from 0.1 to 1.5 seconds), and Jaffe and Feldstein (1970) have indicated that the length of silence alone is a predictor of exchanges of the floor. There is evidence that the matter is not so simple, but that other coverbal behaviors are also determiners of switches (Duncan, 1972; Kendon, 1967); however, these behaviors may be used more or less automatically and irrespective of the relationship between interactants. The well-known fact that some coverbal behavior occurs in telephone conversations where the other participant cannot possibly see it may be evidence that this automatic behavior exists. If this is true, then rules governing switches of the floor are not relevant to models dealing with the social relations between interactants. In reality, it is hard to believe that this is the case, since many switches of the floor involve rule violations and indicate a breakdown in the communication process. It is important to bear in mind, however, that most coverbal behaviors are extremely well-learned and may be partly automatic.

Finally, it is possible that overtalk switches are not rule violations at all. Indeed, there is some evidence that they may indicate involvement

in the interaction, in that they frequently occur in the middle of conversations (Gallois & Markel, 1975). If this is the case, and thus if only the overlong switches are evidence of rule violations, then there were probably too many smooth switches, and too few rule-violating ones, in the present study for any regularities to be perceived. Thus, it would probably be necessary to observe greater differences in both amount of synchronization of behavior and in switch types to be able to examine the extent to which synchrony and switches of the floor are related.

These possibilities are not all compatible, and this study does not provide a means of deciding among them. The results of this study, however, do not totally rule out the possibility that the co-occurrence or the concatenous model may provide a basis for predicting exchange of the floor.

Findings Relevant to Sex Role

The results of the present study do not provide evidence that the sexual composition of dyads is related to the extent of synchronization of coverbal behaviors in conversational interaction. Mixed-sex dyads were not significantly more likely to synchronize any of their coverbal behaviors than were same-sex dyads. It does appear, however, that they were somewhat more likely to do so (all of the results were in the predicted direction). In addition, the results of the analyses of variance, in which mixed-sex and same-sex dyads were considered separately, indicate that although dyads of different sexual composition synchronized their behavior in similar ways, members of mixed-sex dyads appeared to be somewhat more consistent.

Given this tendency, it would probably be unwise to conclude that sex role expectations play no part in determining the extent to which coverbal behaviors are synchronized in conversation. Rather, several other variables may be mitigating the influence of sex role on the expectations of members of the dyads at the outset of their interactions. Several such variables should be mentioned.

First, although the subjects in this study differed with respect to sex, they were similar in that all of them were undergraduate students. Moreover, they were conversing with partners with whom they were acquainted only as students. Since students in general are expected to strive for the solution to problems set before them and to participate fully in discussion of these problems, they may enter any interaction in which their status as students is salient with the expectation that neither partner will dominate the other. Thus, there may be less competition for dominance in same-sex dyads than would otherwise occur. On the other hand, female students may behave in a less submissive manner than women in other mixed-sex interactions, so that sex-role expectations held by males may not be confirmed. In this case, synchronization of behavior may break down to some extent in mixed-sex dyads, making them more similar to interactions in which both partners are of the same sex.

This possibility seems especially plausible in the present study, given the nature of the topics under discussion. Both abortion and cohabitation are at least as relevant to women as to men, and women also probably have a sophistication with the first topic which men lack. They may have behaved in a more assertive manner, therefore,

thus further disconfirming expectations based on sex role and contributing to a lower level of synchrony in the conversation.

A second possible mitigating variable, related to the one discussed above, results from the fact that subjects in the present study were acquainted with each other. It is likely that preconceptions based on sex role are most relevant when people are not acquainted, and thus when they have little information upon which to base their expectations at the beginning of an interaction. In that case, sex-role expectations may provide a significant increase in the amount of information available to interactants and may thus smooth the course of their conversation. If they are already acquainted, however, they may already be familiar enough with each other to permit synchronization of behavior, so that sex-role expectations are not a significant aid to interaction.

One more related variable--the setting of the interactions--should also be considered briefly. The locale for the conversations in the present study had much in common with a classroom. The room was situated in an academic building, and was furnished rather sparsely. In addition, the public nature of the interactions was well-symbolized by the presence of cameras, microphones, and tape recorders. The environment, therefore, may have underlined the subjects' student status to the point where sex-role expectations were not very relevant, so that the extent of behavioral synchrony was similar regardless of the sex of the partners.

Previous research has indicated that all of the variables discussed here mitigate sex differences in behavior. In addition, several studies by sociolinguists have shown variations in verbal behavior as a function of the topic of conversation (Ervin-Tripp, 1964), physical setting

(Gumperz, 1964; Rubin, 1968), and level of acquaintance (Labov, 1972; Rubin, 1968). Burris (1975) also concluded that her failure to find predicted sex differences in intonation patterns may have resulted from some of these variables. Research on sex roles, however, has not really taken these variables into account, but has concentrated on explicating sex roles in the abstract. Future studies, therefore, might examine the way in which situational variables interact with sex-role expectations, and how this interaction influences the synchronization of behavior. To do this, research on sex-role stereotypes must first be expanded to encompass expectations about different settings and activities; research about expectations about women who are successful in "male" pursuits, like that done by Feather and Simon (1975) and Horner (1970), represents a move in this direction. At that point, the influence of the expectations on interaction can be more readily studied.

In any case, the sex of the participants in conversation did not make a significant difference to the synchronization of coverbal behavior in the present investigation. Since some differences in behavior between the two types of dyads were observed, however, subsequent sections of the discussion will make mention of whether the results applied to same-sex dyads, mixed-sex dyads, or both.

Findings Relevant to One Interactant: Chaining and Packaging

The results of the present study indicate that people in conversation do synchronize their own behavior across turns. Members of same-sex dyads were found to follow head tilts in one turn with head tilts in the next; a trend indicated that facing was similarly followed by facing. In mixed-sex dyads, facing, hand movements, and head tilts in one turn were most likely to be followed by the same behavior in the next turn.

As was mentioned in the Introduction, previous research has also shown intra-individual stability in the use of many coverbal behaviors. The measurement of the occurrence of coverbal behavior within a turn, thus, seems to be sensitive to regularities in behavior which have been found using other methods of analysis. This agreement gives some additional indication of the validity of the measures used in this investigation. This point will be discussed further in a later section.

Interestingly, head nods were most likely to be followed (in the mixed-sex dyads) not by head nods but by pausing. This finding indicates, for one thing, that when subjects nodded their heads, they tended to be listeners, thus giving further support for the conclusions of previous research that head nods represent a listener behavior (Dittmann & Llewellyn, 1968). However, the fact that head nods were followed by pausing, rather than simply by a speaking turn, complicates the issue somewhat. This point will be discussed in the next section.

Results of the Packaging measures deserve some comment. Surprisingly, interactants consistently paired relatively few of their own coverbal behaviors within the same turn. Although a given subject might pair two behaviors quite frequently in one conversation, there was little consistency across subjects as to which behaviors were likely to constitute a package.

Nonetheless, a few behaviors were very frequently packaged. Two of these behaviors were left-hand and right-hand movement. When subjects moved one hand, they were very likely to move the other hand in the same turn. It is probably sufficient, therefore, to monitor the movement of only one hand, unless specific gestures are being analyzed.

Left-hand and right-hand body touching were also packaged most of the time in most of the conversations. Thus, tracking of only one hand would probably suffice. Body touching occurred so frequently in the present study that it was eliminated from the analysis altogether, and future research could probably eliminate this measure without great loss of information.

Findings Relevant to Turn Type

The issue of what constitutes a turn has caused some controversy among researchers in the field of nonverbal behavior, and at least two competing definitions have emerged. In the present study, a purely physical definition was used, and an interactant was credited with having the floor every time he or she engaged in solo talking (see Markel, 1975). Other investigators have put forward definitions based on content, and when an interactant makes a remark like "yeah," "I see," or "Do you really think so?" he or she is not credited with having the floor, but instead is considered to be engaging in "backchanneling" (Duncan, 1972; Yngve, 1970). Both of these definitions attempt to circumvent, at least temporarily, the issue of whether there is more than one type of turn. Markel (1975) has proposed dealing with this issue by identifying classes of turns which contain different coverbal behaviors and which serve different functions in conversation. He has extended the nomenclature used in structural linguistics in suggesting that these different classes of turns be called "turnemes." The findings of the present study may be of some use in distinguishing among possible turn classes.

The behavior which seems best to differentiate two types of turns, at least in mixed-sex interactions, is pausing. Hand movement, head

tilt, and head nods all were likely to be paired, within the same turn, with pausing by the partner. Facing, on the other hand, was more likely to be paired with facing. In addition, pausing by one partner in one turn tended to be followed by pausing by the other partner in the next turn; in mixed-sex dyads, facing was likely to be followed by facing. Thus, two types of turns emerge--those which contain facing by both speaker and listener, and those which contain pausing by the speaker.

Turns containing pausing differ from other turns in that they are, in general, longer. This is because a pause, as defined in this research, must be at least 1.0 seconds in length, and must be preceded and followed by vocalizations, so that the minimum length for a turn containing a pause is 1.2 seconds.

A picture thus emerges of two structurally-defined turn types. One of them has as distinguishing features pausing by the speaker, and hand movement, head tilt, and head nods by the listener. Since hand movement and head tilts also seem to be associated with the speaker, the listener and speaker may thus be synchronized on several coverbal behaviors. This type of turn, in addition, must be more than one second long. The other turn type, by contrast, must contain facing by both partners and may be as short as 0.1 seconds. There is also some indication that several turns of the same type are likely to occur in succession.

There is evidence that the length of pauses is positively correlated with cognitive activity (Goldman-Eisler, 1968) and inversely correlated with concern about the socio-emotional aspects of the interaction (Cervin, 1957; Markel, Bein, Campbell, & Shaw, in press). It is possible, thus, that these two turn types are functionally different

from each other as well. Turns with pauses may represent those turns in which most of the information exchange in the conversation is taking place, and where the partner is merely giving indications that he or she is paying attention, for example, by using head nods and head tilt. Turns with mutual facing, on the other hand, may serve other functions, such as indicating who is to make the next point, picking up the train of thought, or reinforcing the relationship between interactants. This last possibility seems especially plausible in view of research showing increased use of facing by people who are concerend with the socio-emotional facets of interaction (Argyle & Dean, 1965; Exline, 1971; Exline, Gray, & Schuette, 1965). Thus, these turn types may represent structurally and functionally different "turnemes."

Comments on the Methodology

At the present time, there is no universally-accepted (or even widely-accepted) method available for the analysis of nonverbal behavior; instead, as Bullowa (1975) has succinctly stated, each investigator develops idiosyncratic techniques and terminology in the conviction that his or her method represents the "right way." The present study reflects this inadequacy in the field as a whole. Some of the problems encountered and the methods developed to deal with them may be of use to future research.

Slow-motion tracking of the frequency and duration of nonverbal behavior is an extremely tedious and time-consuming process. The 24 conversations analyzed in the present study averaged ten minutes each in length; approximately 20-30 monitor-hours per week for twelve months were devoted to tracking them. This period does not include the time

devoted to developing the tracking technique, training monitors, or preparation of the transcripts. In addition, it emerged that certain behaviors, such as head nods and head shakes, could not be tracked in slow-motion and that, in general, the frequency of the behaviors could not be tracked reliably. This second difficulty has appeared in other research (e.g., Erickson, 1975) and seems to result from the tendency of some observers to chop behavior into small, discrete acts where other observers see one continuous movement.

Given these problems, the advantages of tracking the occurrence or non-occurrence of a behavior within a turn are obvious. First, the technique places less stringent demands on observer agreement. Second, the occurrence of coverbal behavior can be observed at normal speed, thus eliminating the necessity for slow-motion analysis. Since the results of the present study indicate that this measure is capable of picking up regularities in behavior which have previously been observed using frame-by-frame analysis, future research could conserve enormously on time and energy by adopting this measure or one similar to it.

The measurement of the occurrence of a behavior has an additional virtue: it is very simple for untrained observers to understand and handle. The duration, and even the frequency, of behavior is almost impossible to keep track of if one is participating in an interaction. The occurrence of behavior, on the other hand, is very easy to track, if one has an appropriate time frame to work from. In verbal behavior, this frame is provided by the word (or, in some cases, the sentence), and occurrence measures have long been used by linguists in isolating the distinctive features of phonemes and morphemes. The turn seems

to provide a similar intuitively-recognizable time frame for the analysis of coverbal behavior and conversation in general; both of the models examined in this study make use of it. Thus, the occurrence of coverbal behavior within a turn would seem to provide a workable measure which can be used both in the laboratory and in the field for the experimental study of the rules governing conversation and for the observation of real-life interactions as well.

The pairing measures developed in the present investigation provide an extension of the techniques described above to the study of conversation as a dyadic process. First, they represent a relatively simple means of relating extra-conversational variables to various aspects of conversation. In the present study, the sex of participants was related to the synchronization of behavior. Other social and situational variables could be related to synchrony or to other aspects of conversation, such as complementarity, using the pairing measures. More complex pairing measures than the ones used here could easily be constructed in order to study directly the association of several coverbal behaviors at once. In addition, these measures could be used in the development of models which predict the course of a conversation through time.

Summary

The present investigation sheds some light on the various ways in which coverbal behaviors are related in conversational interaction. The study compared two models of interaction, a co-occurrence model based on the interact, or pair of turns, and found the first to be superior in ability to predict the synchronization of coverbal behaviors by

participants in two-person conversations. It was concluded that the co-occurrence model is more appropriate for studying nonverbal behavior, but that the concatenous model differentiated between speaker and listener behaviors in a way which might make it useful in analyses of the relation between coverbal and verbal behavior. On the other hand, neither model was able to predict regularities in exchange of the floor (turn switches). Several possible reasons for this failure were discussed. Among them were the possibility that the pairing measures may not be sufficiently fine-grained to deal with turn switches, the fact that synchrony may not be related at all to the rules which govern turn-taking mechanisms, and the ambiguous function of overtalk switches. The results of the present investigation do not provide a basis for choice among these alternatives.

The results of this study failed to support the hypothesis of greater behavioral synchrony in mixed-sex than in same-sex dyads. Again, several possible explanations were offered, and it was concluded that further research should explore the interrelation of these variables in various settings before the hypothesis is abandoned.

Results indicated that participants in conversation synchronize their own coverbal behavior across two turns. This result is in accord with a good deal of previous research pointing to intra-individual stability in the occurrence of coverbal behavior, and thus serves as an indication of the validity of the pairing measures used in this investigation.

A major finding of the present study was the distinction of two different classes of turns: the distinguishing feature of one is

pausing by the speaker, and of the other is facing by both speaker and listener. It was suggested that turns containing pauses may be those in which information is exchanged in a conversation, whereas those containing facing by both participants may function to maintain the interaction during periods of transition.

Finally, the advantages of the occurrence and pairing measures were discussed. This method allows for a faster and easier tracking of coverbal behavior and is readily applicable to use in the field. In addition, these measures are accessible to untrained observers. Finally, the pairing measures represent an approach to tapping the dyadic variables in interaction, and thus to the study of the stream of conversation as it really occurs.

APPENDICES

APPENDIX A

DISCUSSION PROBLEMS ONE AND TWO

APPENDIX A

Discussion Problem One

Mary is four weeks pregnant. Both she and her husband Bob are somewhat ambivalent about having a baby at this point in their lives. Bob tells Mary that she should do whatever she would be most happy with. Mary can go ahead and have the baby or, alternatively, have an abortion. The couple has a steady income, and a baby would present no financial burden. But yet Mary is still ambivalent about a baby. She has other interests in her life and would like to pursue them, but on the other hand, she is not completely adverse to being a mother. What do you think Mary should do? How do you feel about Bob's position on the matter?

Discussion Problem Two

Sandra has just gotten home from work and finds her boyfriend John just ending a telephone conversation. John tells her he was speaking with his parents and that they are arriving the next morning for his birthday. He then tries to convince Sandra that she will have to make it look like she is not living there, but is merely spending the day. While John feels very committed to Sandra now after three months of living together, he is afraid his parents would not react very well to finding out about them at this time. Sandra, however, is of a different opinion, and states she does not need to pretend for anyone. What do you think Sandra should do? How do you feel about John's position on the matter?

APPENDIX B

INTER-MONITOR RELIABILITY FOR TRACKING OF COVERBAL BEHAVIOR

APPENDIX B

Inter-Monitor Reliability for Tracking of Coverbal Behavior

Behavior	Percent Agreement	k_w[a]
Pause	93	.85
Facing	97	.93
Hand Movement[b]	89	.78
Body Touching[b]	97	.94
Head Tilt	88	.76
Head Nods	88	.69
Head Shakes	96	.85
Body Shifts	94	.82
Turns[c]	Duration: $r = .96$	
	Frequency: $k_w = .95$	

[a]See Cohen (1968) for a discussion of this statistic.

[b]Reliability was computed for left and right hand together.

[c]A Pearson correlation coefficient was used to determine reliability on turn duration across a 30-second segment, and k_w was used to determine reliability on turn frequency across a 30-second segment.

APPENDIX C

TURN TYPE I: PACKAGING

APPENDIX C

Turn Type I: Packaging

Behavior 1	Speaking Turn	Facing	Left-Hand Movement	Right-Hand Movement	Left-Hand Touching	Right-Hand Touching	Head Tilt	Head Nods	Head Shakes	Body Shifts	Less than 10%	More than 90%
Pause	8[a]	4	23	22	4	5	22	41	46	47	15[b]	0[c]
Speaking Turn		0	1	0	0	0	1	2	1	0	0	0
Facing			3	5	11	10	13	4	4	4	0	0
Left-Hand Movement				36	2	2	21	10	18	24	5	0
Right-Hand Movement					5	2	9	12	19	22	1	0
Left-Hand Body Touching						33	9	2	5	5	0	28
Right-Hand Body Touching							10	4	5	6	0	23
Head Tilt								17	24	21	3	0
Head Nods									37	35	6	0
Head Shakes										47	24	0
Body Shifts											25	0

[a]Number of subjects in which the two coverbal behaviors were paired in more than 70% of the turns.

[b]Number of subjects in which behavior 1 appeared in less than 10% of the turns.

[c]Number of subjects in which behavior 1 appeared in more than 90% of the turns.

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BIOGRAPHICAL SKETCH

Cynthia Gallois was born in Washington, D. C., on April 9, 1945, and grew up in Arlington, Virginia. In 1962, she left but did not graduate from Wakefield High School in Arlington, and she attended the University of Pittsburgh for one year. In 1963, she transferred to Georgetown University, where she received a Bachelor of Science degree in French and linguistics in June, 1966. Cynthia spent the next several years in Paris, France, and Brussels, Belgium, where she kept herself alive by various means including teaching English as a foreigh language and English-French translation and interpretation. In May, 1970, she and Andre Gallois were married, and they spent a year in Oxford, England, before moving to Gainesville. In 1971, Cynthia enrolled in the graduate program in social psychology at the University of Florida, where she received her Master of Arts degree in March, 1973. Upon completing her Ph.D., she journeys to Australia, hopefully to continue teaching, research, and other forms of nonverbal communication.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Norman N. Markel, Chairperson
Professor of Speech, Anthropology, & Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Marvin E. Shaw
Professor of Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Richard M. Swanson
Associate Professor of Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Franz R. Epting
Associate Professor of Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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This dissertation was submitted to the Graduate Faculty of the Department of Psychology in the College of Arts and Sciences and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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